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# **The Forester**

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of forests and forest trees and to related subjects.**



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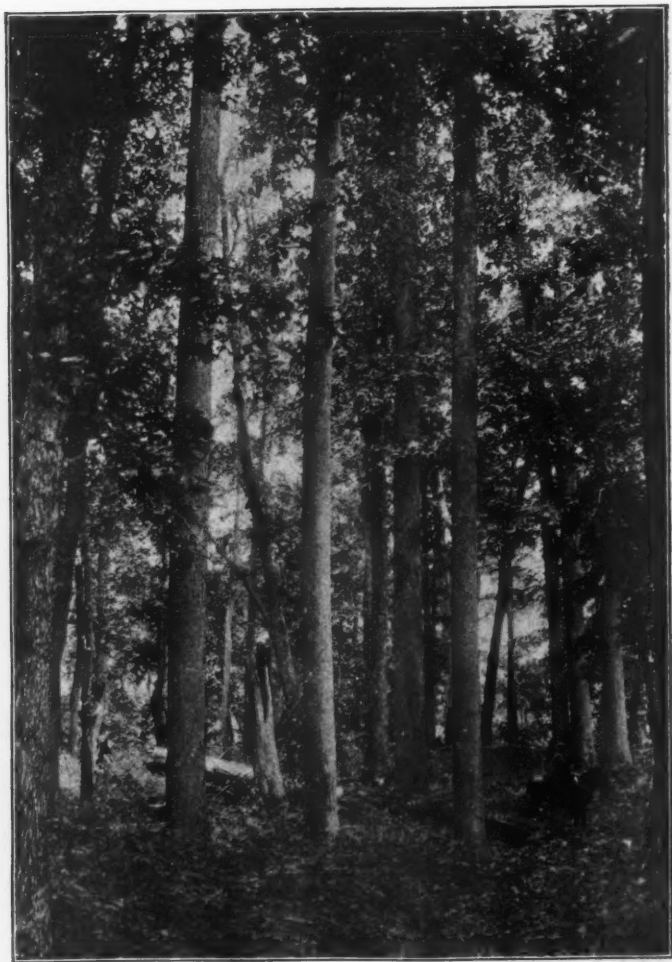
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FOREST SCENE IN WESTERN NORTH CAROLINA  
ON LINE OF SOUTHERN RAILWAY.

# The Forester.

VOL. V.

MARCH, 1899

No. 3.

## News Items.

The Minnesota Forestry Association is the oldest organization of its kind in the United States, having been organized and chartered in 1876.

The penalty for cutting timber on State lands in South Dakota has been heretofore a fine of at least \$1,000, but a bill has lately been introduced to reduce the fine to \$250 to \$500 or imprisonment of not less than six months.

Mr. Charles A. Keffer, for the past five years Assistant Chief of the Division of Forestry, has resigned to accept a position as the head of the department of horticulture and agriculture in the New Mexico Agricultural College, at Mesilla Park, N. M.

President McKinley formally disapproved of the act of the Choctaw Indian Council, in the Indian Territory, which prohibited the sale of timber on the Indian lands after January 1, 1899, and required saw-mills to cease operations on that date.

Mr. Geo. W. Strand, secretary of the Minnesota Forestry Association, is furnishing a series of press articles on forestry topics. They are sent out twice a month to the papers of Minnesota, and as nearly a hundred journals are publishing them regularly a large circulation is assured for the interesting and valuable matter contained.

Mr. John D. Benedict has resigned the superintendency of the New Mexico-Arizona Forest Reservation District to accept a position as Superintendent of Indian Schools in the Indian Territory. Mr. Benedict, who was appointed from Illinois, made a very creditable record as a faithful and diligent official during

the six months that he was a forest superintendent and it is to be regretted that a more tempting offer should take him to another field.

A bill was introduced into the Minnesota Legislature, by Representative Brusletten, of Goodhue County, to repeal the forest law of that State and abolish the fire warden system. The measure was defeated as it deserved to be. Since the enactment of the new forest laws in 1895 Minnesota has been free from the ravages of serious forest fires, though during that time the pine regions of neighboring States, where no provision for fire prevention has been made, have suffered severely.

Henry Weber, of Eau Claire, Marathon County, Wis., stated lately that he had within a short time cut what he believed to be the biggest pine tree ever cut in that county. The tree was cut into eleven logs, most of which were twelve feet in length, which scaled a total of 6,780 feet. The butt log at the large end measured five feet five inches in diameter. There was no mill in the neighborhood that could saw the butt log, and Mr. Weber intended to split it with dynamite.

Great Britain is preparing to expend \$800,000 per year for a period of thirty years in the development of the agricultural region of upper Egypt by the construction of a series of gigantic irrigation works. The arable area of the Nile valley at present is about 10,500 square miles and it is proposed to augment this amount by the reclamation of at least 2,500 square miles of arid lands within six or eight years. Active work on the construction of the first great dam across the river has begun.

Not long since the representative of a Puget Sound lumber mill sold a small bill of timber consisting of four pieces 18 by 18 inches by 60 feet long, and four pieces 16 by 16, 55 feet long. The whole bill amounted to about one carload, but owing to their length the timbers had to be shipped in two cars, making double freight. The delivered price, therefore, was very high for this class of material—almost prohibitory it would seem—but there is where the Pacific coast producers have the advantage.

Dr. S. A. Knapp, of Louisiana, who recently returned from the Philippine Islands, reports that he saw a section of a mahogany tree that was purchased at Manila by U. S. Consul Williams to be sent to this country. It was between seven and eight feet in diameter and of most remarkable beauty. It is to be made into tops for center tables. Dr. Knapp visited China, Japan and the Philippines as special agent of the Department of Agriculture for the investigation of the rice-growing industry.

A White Oak tree was cut in Knox county, Indiana, in January that is supposed to have been one of the largest of the kind ever cut in that section. It measured eight feet four inches at the butt, fifty-three inches at the small end, scaled 7,867 feet, and made four twelve-foot logs. The tree was cut and rolled to White River and loaded on a barge, taken to Mt. Carmel, Ill., rolled to side track and loaded two logs to a car. A silver dollar would have covered the heart of any one of the logs. The tree was bought by John S. Dickson, timber buyer for A. B. Mickey & Sons, Princeton. The logs will cut quartered oak panels, 27 to 28 inches wide.

Until very recently Beech has been used for only a few purposes, such as plane stocks and tool handles. It is now recognized, however, that the wood is admirably adapted for furniture and interior finish. There is some diffi-

culty, it is true, in seasoning Beech in any thickness above one inch; but this may prove only a temporary limitation, and meantime it can be widely employed, especially when the stock is cut quite thin, making a satisfactory veneer. When quarter-sawed, the wood equals the Sycamore in the beauty of its grain. In the hardwood section of the middle South the tree attains a splendid size, with long clear bole, and there are many mixed forests in which it occurs in abundance.

Owners of timber lands in Pennsylvania are interested in a law that was enacted by the last Legislature which provides that the owners of land in that State having on it forest or timber trees of not less than fifty trees to the acre shall be entitled to receive annually from the commissioners of their respective counties during the period that the said trees are maintained in sound condition upon the land, a sum equal to eighty per centum of all the taxes annually assessed and paid upon said land, or so much of eighty per centum as shall not exceed the sum of forty-five cents per acre. No one property owner shall be entitled to receive said abatement on more than fifty acres, and proof must be made that each of said trees measures at least eight inches in diameter at a height of six feet above the surface of the ground, and that no portion of said land is absolutely cleared of said trees.

The following editorial paragraph appeared in a recent issue of the *Philadelphia Record*:

It is a pleasure to know that two misde-meanants found guilty of kindling forest fires are languishing in the Huntingdon County jail. The news ought to be spread abroad in the State as a deterrent to others who, out of willful malice or a mere spirit of devilry, are guilty of this crime. The yearly destruction of growing timber in Pennsylvania by reason of spreading fires inflicts heavy loss upon owners of woodland property, and makes almost nugatory the effort of the State for forest preservation.



## Why Lumbermen Should Be Members of the American Forestry Association.

The prevalence of forest fires during the past summer has called attention to the necessity of forest protection with unusual force. The destruction of forests by fire brings losses to many parts of the community, but to none more direct and severe damage than to the lumber interest; and the benefits that would accrue to lumbermen through the protection of forests against fire are correspondingly great. Such protection would mean the preservation of the raw material of the lumber trade on the stump, and in many cases the safety of the private property of the lumberman in the form of mill and machinery, dams, roads or slides, as well as in that of standing timber or logs in the woods. Protection of this kind costs the lumberman very heavily at times, although the State or Government should rightly bear the cost of an organization to guard against fire in the forest, just as cities maintain fire engines and apparatus and hire firemen at their own expense.

The continuation of the lumberman's business depends first of all on the success of the attempt to check forest fires. When the productive forests disappear the lumberman will go with them. In many parts of the country this result is nearer at hand than is often supposed, and in the case of individual millmen great hardships are very frequently imposed by the destruction of their tributary timber by fire.

Combined action on the part of all who are interested in the protection of forests and the perpetuation of the lumber trade is absolutely necessary before any successful attempt can be made to check this enormous evil. Forest fires throughout the United States are frequent to a degree little understood except by men familiar with the woods, and the magnitude of the task of checking them is correspondingly great. The American Forestry Association offers the means

of united action between the lumbermen of the East and West, the North and South, toward this most necessary end. Organization is absolutely essential in any attempt of this kind, and the established reputation of this Association, the strong names already on its rolls, and its history of honorable accomplishment, make it by far the best means for the purpose in hand.

But if we suppose forest fires to be checked throughout the country, the interests of the lumber trade will still be only partially protected. Destructive methods of lumbering are often not less harmful in their results to the lumber business itself than the severest fires. Lumbermen hitherto have given but little attention to ways of cutting and getting out their timber which would not destroy the productive value of forest land. In other words, cutting with a view to perpetuating the supply of lumber through the protection and reproduction of the forest has had little attention from lumbermen until now. Many of those who have considered it have not believed it was practical, but by far the greater number have scarcely considered it at all.

Conservative lumbering differs more widely from forest protection, as it is understood by those mistaken friends of the forest who are anxious to have all the trees die on the stump, than from the methods of lumbermen ordinarily used. It consists simply in taking such precautions in cutting and getting out the timber as will insure a valuable second-growth. In the Adirondack forests of New York, for example, such lumbering has recently been introduced on two large tracts covering together more than one hundred thousand acres, and during the past fall and early winter fifteen camps were cutting in this way. The reasons which led to the adoption of these methods were strictly business

ones. The removal of the old timber in a way to protect and promote the growth of the young trees adds very little to the cost of lumbering, while the increased value of the land after cutting much more than repays the additional expense.

The method used in the Adirondacks will naturally not apply to all the forest regions of the United States, but other methods of conservative lumbering can be used with advantage almost everywhere. The American Forestry Association works for the diffusion of a knowledge of these methods and for their adoption throughout the United States. In doing so, it seeks to perpetuate, not to destroy, the lumber business of the country, and it is already receiving the support of prominent lumbermen in different parts of the United States.

The Association understands thoroughly the premium set on the destruction of timber by heavy taxation on timber lands, cut and uncut, and is prepared to interest itself actively in bringing about a change. The possession of an appropriate and effective organ in THE FORESTER, with its extensive exchange

list and its circulation among men of influence, gives it peculiar advantages in any agitation of this kind.

Much misunderstanding has existed, and much still exists, on the part of lumbermen and others as to the law and the rules and regulations which govern the National Forest Reserves. It was believed at first that the intention of the Government in making these reserves was to withdraw them from use altogether, and to prohibit the settlement of agricultural lands within their boundaries. A better understanding has gradually come about, but the specific provisions of the law are not yet widely known.

Extracts from the law and the regulations issued under it, explaining in detail the ways in which the reserves may be made useful to the communities near which they lie, and the regulations to be observed in the use of their timber and other resources, appeared in the February issue of THE FORESTER. Applicants for membership in the American Forestry Association whose letters to that effect are received before April 15 will receive the February number until the edition is exhausted.

## The Douglas Spruce of Northern Oregon.

BY HENRY S. GRAVES.

It is not improbable that the Douglas Spruce in Washington and Oregon grows more rapidly than any other coniferous tree. The long annual shoots of the young saplings and the wide rings on the stumps of trees which have grown in open situations are noticeable even to casual observers. There have been published from time to time measurements of the growth of the Douglas, but they have usually (with the exception of a few by Dr. Heinrich Mayr) been taken on old trees at haphazard in the forest, and may or may not represent the capability of the tree under average conditions. A complete knowledge of its growth can be obtained only through an

exhaustive study, such as is to be begun during the coming summer by the Division of Forestry. A few figures representing average conditions only and put in a usable form should, however, prove valuable until this investigation has been completed. The measurements of growth summarized below, together with the notes on the silvicultural character of the tree, were collected by the writer during the summer of 1896, in connection with a special report prepared for Mr. Gifford Pinchot.

### OCCURRENCE.

Douglas Spruce is found from tide land to an altitude between 5,000 and 6,000



feet above sea level. A few scattering trees occur near the coast, but they dis- tion at which the writer observed it on the eastern side of the Cascade Range



DOUGLAS SPRUCE, NEAR ASTORIA, OREGON; DIAMETER, THIRTEEN FEET;  
ESTIMATED HEIGHT, THREE HUNDRED FEET.

like the tide land and only begin to reach their normal development above recent sea deposits. The lowest elevation at which the writer observed it on the eastern side of the Cascade Range was 2,800 feet. Along streams, however, it is probably found at a lower altitude. It reaches its best development

west of the summit of the Cascades. below 2,500 feet, on river bottoms, in sheltered ravines, on rich benches and on moderate slopes. It attains the greatest height and produces the most valuable timber when growing in dense forests, on well-drained, loamy soil and in sheltered situations. It occurs, however, in abundance on rocky soil, steep slopes and exposed ridges, where it is apt to be comparatively short and scrubby. For its best development a considerable amount of moisture in the air is required, and on this account it prospers better on the western than the eastern slopes of the Cascades. A deep soil is not required on account of the shallow root system. This is well illustrated in the lower Santiam Valley, where Douglas Spruce is frequently found growing with great vigor, and producing tall, straight timber, on ground with an impermeable subsoil, in which the White Oak is short and stunted.

#### HABIT.

When growing in open situations, Douglas Spruce develops a large spreading crown, which gives the tree a broad, conical aspect. Such trees are comparatively short and grow rapidly in diameter. In dense stands, on the other hand, the trees are very tall, shed their lower branches early, and form long clear boles with narrow compact crowns. Douglas Spruce carries its diameter well up into the crown, and in case of very old trees, the stem then tapers within a few feet abruptly to a point, this portion being usually bent in the direction of the prevailing wind.

The largest tree measured by the writer was thirteen feet in diameter and had an estimated height of nearly 300 feet. One observer states that he measured a tree in Washington 335 feet high and fifteen feet in diameter. The oldest tree, whose age was determined during the present study, was about 400 years old, but specimens have been found with 700 annual rings on the stump.

The bark of young trees is light gray or white, and is smooth, thin, and covered with resin blisters. When twenty to thirty years old the bark becomes longitudinally cracked. In later life the

color varies from dark brown, almost black, to a whitish gray; and often on old trees it is reddish, or light brown tinged with yellow. At about fifty years of age the bark is six-tenths to nine-tenths of an inch thick, and on old trees three to six inches or even more.

Lumbermen distinguish between Red and Yellow Spruce, but botanically these are identical. They differ only in the character of the lumber they produce. The Yellow Spruce is old and mature, and is generally found in dense forest on good soil and in favorable situations. The trees have long, clear, full trunks, narrow crowns, and a fine-grained, yellowish wood. Often, however, the wood has a reddish tinge near the center. The bark is usually light brown, tinged with yellow, and is less coarse in texture than that of the Red Spruce. The latter has a comparatively large crown, deeply corrugated bark, and coarse-grained, reddish wood. The Douglas found on the eastern slope of the Cascades, or growing in open situations, is for the most part Red Spruce. The yellow variety is confined to the Pacific slope.

The wood of the Douglas is extremely durable. Trees have been known to lie on the ground forty years and be perfectly sound. Stems of trees which have been killed by fire stand many years before decaying. On one plot of even-aged trees eighty-three years old, near Permelia Lake old stubs of the original timber were still to be seen, though decaying and crumbling to pieces.

#### TOLERANCE.

The Douglas Spruce cannot live in very dense shade. This is shown by the great scarcity of young growth in the deep forest, where the proportion of old Firs which are constantly distributing seed, is large. Among the western conifers it stands between White Pine and Noble Fir in the scale of tolerance, the former bearing more shade and the latter less.

#### REPRODUCTION.

The youngest tree found bearing seed was only sixteen years old. It was growing, however, in excellent soil and in an open situation. In the forest the period at which the Douglas Spruce bears seed

begins much later. Observers testify that it bears fruit every year, but that in some years the production of seed is more abundant than in others and that frequently the cones are barren. It is certain, however, that seed is produced abundantly and at short intervals, and that the tree continues to bear late in life. Very old trees, such as the veterans on the slopes of the Coast Range, reproduce themselves sparsely. Trees bear more plentifully on rich than on meagre soil; in open places than in dense stands; and at low than at high elevations.

In the dense forest young seedlings are practically wanting, but where the stand is broken groups of small trees are abundant. A certain amount of light is, therefore, necessary for the germination of the seed. The second essential condition of germination is a good seed-bed. Young seedlings are found in largest numbers on ground which has been broken so that the mineral soil is exposed. A matting of leaves or a firm sod, on the other hand, seems unfavorable to the reproduction of the tree. When the upper layer of humus has been burned off the reproduction is excellent. This is the reason that fires are often followed by a magnificent growth of young Douglas Spruce. Near seed trees the second growth is usually very dense, but where a tract has been stripped by fire, and seed has to be borne from a considerable distance, the result is an irregular, rather ragged, growth of trees,

varying greatly in size and age. Under such conditions two and sometimes three generations of trees are necessary to seed the ground densely enough to establish a forest equal to the original growth.

#### GROWTH.

In order to determine the rate of growth, the following method was employed: Sample plots were measured off in second growth which had come up in regular even-aged stands. All trees on these plots were counted and their diameters measured at breast height. The average diameter was then determined, and a sample tree of this diameter and apparently of average height, was felled, and measurements were taken to determine its contents and rate of growth. This average tree was used as a basis for the computation of the total contents of all the trees on the sample plots and of the average growth in height and diameter.

The writer was fortunate in finding a number of even-aged groups of nearly pure second-growth Douglas in the Santiam and Willamette Valleys on what had been grass prairies before the country was settled. The repeated fires, probably set by the Indians, had prevented new growth from coming up; but when the fires were checked by the whites, the few scattered Douglas which had survived from a former forest seeded the ground rapidly to young timber.

There were measured, in all, nine sam-

TABLE No. 1.—Summary of Measurements of Nine Sample Trees.

| Tree. | Diameter breast-high. | Diameter of stump. | Diameter inside bark. | Height of stump. | Age of stump. | Height of tree. | Age of sap. | Width of sap. | Volume.    | Current annual growth. | Locality.            |
|-------|-----------------------|--------------------|-----------------------|------------------|---------------|-----------------|-------------|---------------|------------|------------------------|----------------------|
| No.   | Inches.               | Inches.            | Inches.               | Feet.            | Years.        | Feet.           | Years.      | Inches.       | Cub. feet. | Per cent of total vol. |                      |
| 1     | 1.75                  | 2.3                | 2.0                   | 0.3              | 23            | 29.2            | ...         | ...           | ...        | ...                    | Clackamas ..... Ore. |
| 2     | 3.0                   | 3.5                | 3.0                   | 0.5              | 22            | 38.2            | ...         | ...           | 1.11       | ...                    | Shelburne ..... "    |
| 3     | 6.7                   | 7.2                | 6.2                   | 2.0              | 32            | 68.8            | 15          | 1.0           | 9.61       | 3.2                    | Clackamas ..... "    |
| 4     | 7.1                   | 7.9                | 6.5                   | 1.3              | 41            | 73.5            | 27          | 1.7           | 10.3       | 4.0                    | Shelburne ..... "    |
| 5     | 7.6                   | 8.3                | 7.1                   | 1.8              | 38            | 80.5            | 18          | 1.2           | 13.8       | 4.0                    | Shelburne ..... "    |
| 6     | 8.2                   | 9.4                | 8.2                   | 1.8              | 37            | 77.5            | 17          | 1.3           | 16.4       | 4.2                    | Shelburne ..... "    |
| 7     | 9.6                   | 10.4               | 9.0                   | 1.3              | 40            | 85.5            | 18          | 1.3           | 21.7       | 4.2                    | Shelburne ..... "    |
| 8     | 8.4                   | 9.6                | 7.8                   | 1.0              | 50            | 91.1            | 21          | 0.8           | 10.1       | 2.6                    | Clackamas ..... "    |
| 9     | 19.0                  | 19.2               | 16.6                  | 2.0              | 83            | 138.8           | 32          | 1.6           | 115.2      | 1.5                    | L. Permelia..... "   |

ple plots: four near Clackamas, four in the Santiam Valley near Shelburne, and one between Detroit and Permella Lake. The measurements of the trees which were analyzed on the various plots are summarized in Table No. 1.

The annual growth of each tree in diameter and height was worked out separately from the stem analyses, and the average of all obtained by entering the values on cross-section paper and drawing normal curves through them. The rate of growth for each decade was then read directly from the curves. These values are given in Table No. 2.

TABLE No. 2.

Rate of Growth in Height and Diameter.  
*Average of Nine Trees.*

| Age.   | Height. | Current annual growth. | Diameter. | Current annual growth. | No. of years required to grow one inch. |
|--------|---------|------------------------|-----------|------------------------|---|
| Years. | Feet.   | Feet.                  | Inches.   | Inches.                |   |
| 10     | 10      | 1.0                    | 1.9       | .19                    | 5                                       |
| 20     | 33      | 2.3                    | 4.2       | .23                    | 4                                       |
| 30     | 57      | 2.4                    | 6.6       | .24                    | 4                                       |
| 40     | 76      | 1.9                    | 9.0       | .24                    | 4                                       |
| 50     | 92      | 1.6                    | 11.4      | .24                    | 4                                       |
| 60     | 106     | 1.4                    | 13.4      | .20                    | 5                                       |
| 70     | 120     | 1.4                    | 15.0      | .16                    | 6                                       |
| 80     | 132     | 1.2                    | 16.3      | .13                    | 8                                       |

From this table it will be seen that

TABLE No. 3.—Summary of Sample Plots, Showing Yield per Acre at Different Ages.

| Plot. | Area.    | Number of trees. | Number of trees under 1 inch. | Average diameter, breast high. | Maximum diameter, breast high. | Average age. | Average height. | Contents. | Density of the forest. | Number of trees per acre. | Contents, per | Cords, per acre. | Locality.       |
|-------|----------|------------------|-------------------------------|--------------------------------|--------------------------------|--------------|-----------------|-----------|------------------------|---------------------------|---------------|------------------|-----------------|
| No.   | Ac. res. |                  |                               | Inches.                        | Inches.                        | Years.       | Feet.           | Cu. ft.   |                        |                           | Cu. ft.       |                  |                 |
| 1     | 0.06     | 242              | 109                           | 1.8                            | 7                              | 23           | 29.0            | .....     | 1.0                    | 4,033                     | .....         | ...              | Clackamas. Ore. |
| 2     | 0.25     | 701              | 125                           | 2.9                            | 10                             | 22           | 38.0            | 1,037     | 1.0                    | 2,804                     | 4,346         | ...              | Shelburne. "    |
| 3     | 0.25     | 168              | ....                          | 6.7                            | 16                             | 32           | 69.0            | 1,613     | 1.0                    | 672                       | 6,451         | 72               | Clackamas "     |
| 4     | 0.25     | 128              | ....                          | 7.1                            | 20                             | 41           | 74.0            | 1,113     | 0.8                    | 428                       | 4,451         | 51               | Shelburne. "    |
| 5     | 1.0      | 645              | ....                          | 7.3                            | 17                             | 38           | 81.0            | 8,901     | 1.0                    | 645                       | 8,901         | 99               | Shelburne. "    |
| 6     | 1.0      | 490              | ....                          | 8.9                            | 19                             | 37           | 78.0            | 8,036     | 0.85                   | 490                       | 8,036         | 90               | Shelburne. "    |
| 7     | 1.0      | 360              | ....                          | 10.2                           | 21                             | 40           | 85.5            | 7,812     | 0.9                    | 360                       | 7,812         | 87               | Shelburne. "    |
| 8     | 1.0      | 353              | ....                          | 8.9                            | 19                             | 50           | 91.1            | 6,742     | 0.8                    | 353                       | 6,742         | 76               | Clackamas "     |
| 9     | 1.0      | 150              | ....                          | 19.9                           | 40                             | 83           | 139.0           | 17,280    | 0.7                    | 150                       | 17,280        | 190              | L. Permella "   |

the tree reaches its maximum rate of growth in height between its twentieth and thirtieth years, during which period it is shooting up two and four-tenths feet per annum. The mean annual growth in height for the first thirty years is one and nine tenths feet, or slightly less than the current annual growth. The rate of growth in diameter is very regular. It reaches its maximum at about the thirtieth year and continues at the rate of twenty-four one-hundredths of an inch per annum until the tree is about fifty years old, when it begins to decrease. It must be borne in mind that these figures of growth do not represent what an individual tree is capable of doing if given favorable conditions of light and growing space, but are the average for all trees both large and small, in a dense forest.

The chief purpose in taking the measurements of sample plots was to determine the number of trees per acre and the total contents at different ages. Table No. 3 gives a summary of the nine valuation surveys, and shows for each plot the number of trees, the average age and maximum diameters, the average height, age and density, and the total contents in cubic feet and cords. No computation of board feet was made because, with the exception of a few specimens on Plot No. 9, the trees were not of a merchantable size.

These figures show that on a fully stocked plot there are between 3,000 and 4,000 trees per acre at twenty years of age. As the trees grow older they re-

the age of eighty-three years with a density of only seven-tenths (a fully stocked area being rated as one). The most striking feature of the table is the



A GROWTH OF DOUGLAS SPRUCE ABOUT FIFTY YEARS OLD.

quire greater room for their development, and in consequence many are overtopped and die. While the number of trees per acre falls off with increase of age, there are still 150 trees on Plot No. 9 at

large yield in cubic feet and cords. An examination of the last column of figures will show that the mean annual increment is something over two cords per acre.

## The Collection of Statistics.

Under date of December 26 Dr. C. A. Schenck, forester of the Biltmore Estate, wrote to the *Northwestern Lumberman* offering some suggestions as to methods of gathering timber statistics. Dr. Schenck holds that to be of permanent use such an investigation should include every tree species. As to the selection of a unit of measurement he would reject as inaccurate all commonly accepted rules for finding contents in board feet and use only the cubic foot. After suggesting that much will depend upon the extent to which the investigation is carried—how far up the bole of the tree, and the minimum size of small or young trees to be measured—and also as to what shall constitute a forest within the meaning of such an investigation, Dr. Schenck then takes up the cost of such an investigation as follows:

It will be interesting to find out what the stock-taking of the American forests will cost. The United States has an average width of about 3,000 miles and an average length of 1,250 miles. If the country was traversed on every meridian, and if for the width of four poles lying on that meridian the amount of standing timber, the area of brush land, of agricultural land, of waste land, of prairies, etc., was found out, very complete statistics could be obtained. There will be 60 strips, 50 miles apart one from another. Multiplying the result obtained on each strip by the ratio "distance between the strips divided by width of strip," the amount of timber land and the growing stock, the amount of brush land, of waste land, or agricultural land, etc., would appear at a glance. I do not think that the stock taking could be done by ordinary lumbermen. I have had several tracts in this neighborhood investigated relative to the amount of timber growing on them by highly-recommended lumbermen. The results given in by different lumbermen for the same tract vary by about 500 per cent. I am confident that inaccurate results would be obtained by the Government statistics as well, if they were taken with the help of average lumbermen. A thorough scientific way is the only one that will yield the desired result. A combination of agricultural statistics with the forest statistics will cheapen the entire work very considerably, while it will make it more interesting at the same time.

The head man of a "band of stock-takers" should be a botanist well acquainted with the

flora of the region in which he is working. In such places for which maps are not available a geologist and a surveyor should accompany him. Supposing that a band can thoroughly investigate the length of five miles a day, one of the strips above mentioned, being 1,250 miles long, could be done at an expense of about \$20,000. As there are 60 strips to be pursued, the total expense would amount to \$1,200,000.

I think the strip system is more advisable than estimating the standing timber by counties. In the latter case, the inaccessible parts of the country are necessarily over or underestimated, and there is little chance that a mistake made in the plus direction will be eliminated by another mistake made in the minus direction.

The strip system above recommended will compel the band of stock-takers to visit even more or less inaccessible places. The outcome will be maps showing at a glance forests, brush land, abandoned fields, cultivated fields, grass lands, etc. Other maps will show the amount of cord wood standing per acre; again others, the amount of annual regrowth; finally, and that is for us the most important point, the amount of timber standing in the different States and counties given by species, average size and average quality will be shown by tables and illustrated by maps.

In commenting upon this proposition of Dr. Schenck's, Dr. B. E. Fernow, Director of the New York State College of Forestry, says:

One-quarter the expenditure proposed by Dr. Schenck will secure this information with sufficient detail for practical uses in measuring our forest resources.

Mr. Henry Gannett, who is in charge of the forest work of the U. S. Geological Survey, takes decided issue with Dr. Schenck as to the means that should be employed in the collection of lumber and timber statistics. In regard to this matter Mr. Gannett writes as follows:

"The 'stock-taking' is at present in progress; for the past two years the U. S. Geological Survey has been actively engaged upon it, and an area of about 200,000 square miles, including some of the most heavily-timbered portions of the country, has been covered. Moreover, for nearly a score of years, the Geological Survey has been gathering data concerning wooded areas and placing them on its maps.

"The method employed is the simple



one of compiling all *definite* information regarding timbered area and stand, and supplementing this by examinations in the field. All lumber regions of importance have been cruised, some of them repeatedly, in the interest of lumber companies, land grant railroads, etc., and the amount, distribution, species and condition of the timber, as closely as they can be estimated by trained men, are matters of record in the possession of these companies. Abstracts of such records can commonly be obtained at trifling expense under the sole condition that they be not published in such form as to injure the company's business. From railroads, lumber companies, State land offices and other parties in Oregon and Washington, I have obtained cruisings of many thousands of square miles, under this condition only, and these cruisings, with the accompanying information regarding the forested areas, furnish the basis for a close estimate of the amount of timber in these States, outside of certain mountain regions in which no examinations have yet been made. This estimate is, of course, based on the present lumbering practice in the region, by which only about one-third of the tree comes out of the mill as sawed lumber.

"The wooded area, which is one of the most important factors in these data, has been mapped in greater or less detail over more than one-third the area of the country. The atlas sheets of the Geological Survey show it in much detail on 800,000 square miles scattered widely over our domain. Very little, however, has as yet been published. The Hayden survey mapped the wooded areas of about 100,000 square miles, the Powell survey two-thirds as much, and the Wheeler survey much more, all in the Rocky Mountain Region. All these data are available, and, so far as they extend, furnish one of the two essential items of information.

"As to the accuracy of the cruisers' estimates, I have compared many duplicate cruisings with one another, and many cruisings with the actual amount cut, and have reached a conclusion entirely

at variance with that of Dr. Schenck. When we reflect that millions of dollars' worth of timber land is bought and sold annually, on the basis of these cruisers' reports, we must accord to them some degree of reliability.

"But assuming that cruisers' reports are not sufficiently accurate, what shall be substituted for them? These men have been trained for years in the sole business of estimating amounts of standing timber, and are the only class of men so trained. If their services cannot be made available the only thing is to give up the idea of measuring our forests."

"Where the timber has not already been cruised, estimates are being made by agents in the employ of the U. S. Geological Survey, but owing to the expense involved such examinations are by no means as thorough and detailed as cruisings by private companies. They have been made of some 30,000 square miles, all of which is in the Western country in and adjacent to the forest reserves, and have cost on an average in the neighborhood of \$1.00 per square mile. The cost is not, however, uniformly distributed, the heavily timbered reserves of Washington costing much more than others in which the timber is light and of little present value or is almost wanting as in the chaparral reserves of Southern California. These examinations are made by traveling through the country by such routes as to afford near views of the entire region. All valleys are traversed and many mountains climbed, and estimates of the average stand are made all along the routes. Of course, the timber is classified by species and its condition as to age, soundness, etc., noted. Maps are used for delineating the extent of burns, logged areas and areas of merchantable timber, its different degrees of density, and the distribution of species.

"In the examination of the Bitterroot Reserve, an area of some 7,000 square miles, about 1,900 miles were traveled, on horseback and on foot, or about one linear mile to  $3\frac{2}{3}$  square miles. Much of this area is, however, so high and

rocky that the timber is sparse and valueless, and therefore required little examination, so that most of the work was confined to the lower country which was, proportionally, more closely traversed.

"Dr. Schenck's plan of gridironing the country by routes of travel fifty miles apart is open to many objections. It would involve an enormous amount of unnecessary labor. We know perfectly well what regions are timbered and what not. Why traverse the vast extent of the plains and deserts, where every one knows perfectly well there are no trees? What sort of an idea of the extent and stand of timber in the country could be obtained by traversing it along arbitrary lines fifty miles apart? We have already more information than could be afforded by such a skeleton. As to defining the areas by such journeys, consider the condition of things in the Eastern States, which are naturally timbered and where to-day the timbered and cleared areas form little, irregular patches, a fraction of a square mile in extent, scattered over the face of the country. These can be delineated only by careful, detailed surveys, such as the Geological Survey is now making.

"There remains the question of the unit to be employed in stating the amount of timber. On some accounts, it might be well to use the cubic foot and give the entire contents of the tree, but to this there are two objections. One is that when we had completed our survey, we would know little about the merchantable contents of our forests. The other, that we would be obliged to throw away all the cruisions which have been made and which can be collected at such trifling expense, and to do the work over again.

"That it is desirable to obtain this information regarding our forests, goes without saying. It lies, or should lie, at the bottom of all forestry movements. Such data are fundamental, and to attempt to build up a forest system without them, as we are trying to do, is much like building a house without a foundation."

### Timber Statistics.

It is gratifying to find that the great daily papers are beginning to pay some attention to the lack of reliable timber statistics of the United States. In a recent issue of the *Transcript*, of Boston, there is an interview, supplemented by editorial discussion, with Mr. Weston, of Weston & Bigelow, who insists that whereas now there are no reliable data as to the timber supply of the country it should be no difficult matter to arrange for a fairly accurate census, and urges that Congress should appropriate the money to cover the cost of the work. This is a subject which is of interest not merely to the lumber trade, but of importance to the Government as a basis for formulating some intelligent policy in forestry matters.

At a recent meeting of the American Economic Association, a report was made by a committee which included, among others, Hon. Carroll D. Wright, who is probably the best qualified statistician in the United States. This report called attention to the fact that the Twelfth Census, which is about to be provided for by act of Congress, may prove inadequate to the needs of a nation such as this.

The committee makes criticism not so much of the accuracy of the previous censuses as of the treatment of the data which were secured, and of a lack of continuity from census to census. The committee believes that there should be a permanent census bureau, or that there should be constituted special bureaus, possibly in connection with some of the departments of government, to compile information upon specific subjects. This work should, of course, be in the hands of specialists in these subjects.

This is in line with what the lumbermen of the United States recently have been urging. It has developed during all the agitation concerning the tariff that the official records of the United States are woefully inaccurate and deficient concerning the greatest manufacturing industry of the country—lumber.

Our information from Washington is to the effect that it is the purpose in the bill for the Twelfth Census to strip from it all provision for any information beyond that touching the population of the country. If other subjects shall be taken up, they will be provided for by special acts, which shall define the expenditure and the scope of the investigation to be made. At the meeting of Northern and Southern lumbermen held in St. Louis in November a vigorous set of resolutions was passed, calling upon the Government to provide for a comprehensive statistical survey of the timber resources of the country and a compilation of facts pertaining to wood products.

The resolutions of the American Economic Association are in line with these suggestions. If anything is to be done to impress upon Congress the need of some such bureau as those who have had the tariff matter in charge have found to be absolutely necessary, it should be done at once. It will be remembered that in the Eleventh Census Superintendent Porter was able to make a fairly

satisfactory bulletin covering the lumber industry in Michigan, Wisconsin and Minnesota. He failed, however, to compile anything at all comprehensive concerning the great lumber interests in other parts of the country. It seems to the *American Lumberman* that it is of particular importance to the developing lumber interests on the Pacific coast and in the South that some means should be provided for the compilation of a close estimate of the standing timber of every kind in these newer lumbering regions, and accurate data concerning the volume and cost of production, etc. This can be done only by a bureau of experts, with ample time and ample means at their command. Is it not due to the lumbermen of the United States that some such provision should be made? Will not some such compilation be of vast importance and value to the friends of forestry? The subject is of enough importance to demand energetic and persistent effort at the hands of lumbermen all over the country.—*American Lumberman*.

## Forest Management.

### To Reforest White Pine Lands.

An interesting report of Forest Warden Andrews, of Minnesota, calls attention to the effect brought about by the use of the lumber railroads in devastating the forests. "These roads," he says, "reaching far into the forest where no trees can be cut if they must be rafted by river to the points of consumption, are tapping timber lands that were a few years ago supposed to be beyond the reach of the most envious lumberman. They are increasing the cut of Pine in Minnesota by millions of feet yearly, and their ultimate results will be to denude the forests at the very points where forests are absolutely necessary, far up the water-courses and on the ridges and the heights of land."

According to his statement, lumber-

ing began some fifty years ago in Minnesota, and about fifty billion feet of Pine have been cut in that time, and he estimates there still remains some thirty billion more, and unless some methods are taken for rehabilitating these forests they will be gone in from twelve to eighteen years. About 20,000 men are employed in the State on this work and the cut represents an annual value of \$5,000,000 as it stands and about twice that when cut. All this will be lost to the State unless some measures are taken for the reforestation of these tracts. Minnesota is now the only State east of the Rockies left with a Pine forest, Michigan and Wisconsin being practically exhausted. He estimates that there are in Minnesota nearly 3,000,000 acres of waste land, from which the trees have been cut, and on which no taxes will

ever be paid. These lands are reverting to the State for non-payment of taxes as fast as the lumbermen can get rid of them. Active steps are being taken by members of the coming State Legislature and others interested toward the outlining of a plan by which the State shall gradually reforest these millions of acres, and hold the lands as public property to be lumbered as occasion may require and the State may direct. It is claimed that millions of dollars can be earned by this course, and that the lumbering industry in Minnesota can be continued indefinitely and almost uninterruptedly. These new lands, if forested at once, will be ready for the axe by the time the present forests are gone, if the young trees on the present timbered lands are preserved and not ruined by the cutting of those now only large enough to make a board.

"In Europe," he says, "forest lands earn an average yearly of from 27 cents to several dollars per acre, and that Minnesota's abandoned pineries have better soils than most of those of Europe. The State now holds some 800,000 acres of these waste lands and it is proposed to begin experiments and operations on these within a short time, as soon as legislation and appropriations can be secured." Mr. Andrews makes the very reasonable estimate of 90 cents an acre as a return from these lands, which would mean nearly \$3,000,000 a year in revenue to the State, and a far greater income to labor and capital, all of which is now sure to be utterly swept away in a few years, with present methods continued.—*Lumber Trade Journal*.

#### Wood-Pulp Industry:

The wood-pulp bacillus is the enemy of forests, and unless a halt is called in its ravages it may almost eat them off the face of the globe. So many things are now made from wood pulp that the demand for the substance, constantly increasing, becomes practically limitless, and however ample the sources of supply may now seem to be, they have a bound and tend to diminution, while the demand promises a constant increase. Printing paper alone eats an enormous hole in our na-

tional forests yearly, and the future extent of that requirement can only be conjectured. The huge procession of railway cars all over the country runs to some extent on paper wheels; carpenters are beginning to use boards of paper handsomely veined, requiring no planing, twice as durable as the wooden variety, and costing only half the money. The builder is introducing paper bricks showily enameled, which will not burn, and possess many advantages over those of burnt clay. The shipbuilder introduces masts and spars of the same substance, which is likewise used for telegraph and telephone poles and flagstuffs. These are not fanciful experiments, but serious business procedures, justified by the superior utility of the articles so produced. The same quality is claimed for the paper horseshoe recently invented and now extensively used.

An enumeration of the purposes for which this surprising protoplasm has come to be employed would stretch into a catalogue, and new ones seem to be discovered every day. They give a sign of its waxing demand on our forest growths, at which the sylvan economist and conservator may look with apprehension, but just at present it is difficult to see in what way he can intervene for their protection. Humboldt says that wherever the civilized, earth-tilling, wood-consuming man appears in arborescent regions of the globe he provides the conditions for his own extinction by his destruction of forests. His dictum antedates the wood-pulp man, whose appearance certainly does not tend to invalidate it, and, useful as he is, it may in time become necessary to take in hand and impose some kind of restraint upon him.—*New York Tribune*.

The "sylvan economist and conservator," which, in common parlance, means the professional forester, does not "look with apprehension" at the work of wood-pulp industry nor does he regard it as an enemy of the forests. On the contrary he recognizes that the requirements of new conditions must be met by the adoption of new methods and that it is the office of his vocation to provide forest products to meet the necessities of modern civilization. With the sentimental side of the question he has nothing whatever to do. One thing can be said of the wood-pulp industry, and that is, that it wastes less of the product consumed than most of the timber-using industries. If greater demands for material are to be made upon the forest, its productive capacity should be so increased as to equal such demands. This can only be attained by more intelligent methods of

treatment. The wonderful growth of the wood-pulp industry only serves to emphasize the necessity of adopting definite systems of forest management. An enterprise which uses the forest products in the manufacture of needful commodities is a legitimate one, but those interests or industries which are wasteful or destructive in their treatment of the same, should, as a measure of public policy, be regulated or excluded.

#### A Field for Lumber Capital.

Southern timber owners in both Pine and hardwood do not seem to have fully realized the value of their property, and lands are much cheaper in relation to the value of the lumber than is the case in the North. Something of the same kind is the rule in the West, where until the past year there has been little advance in the price asked for logs or timber.

Compared with the vast resources of the South in Yellow Pine, the manufacture of lumber is only just starting. It has taken Northern enterprise and capital but a short time to get a foothold there, and the development will be more rapid in the future than in the past. As the Pine of the North is cut away, the manufacturers have turned their attention more and more to the manufacture of hardwood lumber, but as the field is more limited than was the White Pine field, the surplus capital has looked elsewhere for investment. Part of it has gone West, but much of it has gone South, and from Florida to Texas can be found men who were formerly leaders among the White Pine men of the North.

There are vast tracts of both Pine and hardwood timber in the South that have as yet been untouched by the axe of the woodsman, and of the latter especially there is a wealth of supply. This vast wealth is only just beginning to be appreciated by the lumbermen of the country. On these lands in the South are Cypress, Ash, Oak, Gum, Box, Swamp Maple and Pecan. Cypress is a fine wood for building purposes, and is capable of the finest finish. All of the others have their uses, many of them being especially and specifically appropriate for certain uses in building.

The various kinds of Oak are perhaps the most useful for general purposes of any of the hardwoods, and as an all-round material for build-

ing, furniture and other uses, is perhaps the most valuable of the woods of the South. Southern Oak has been a staple for a number of years, but the supply has not as yet been heavily drawn upon, compared with the amount there is yet standing. Its future is sure to be greater than its past. Southern hardwoods as well as Southern Pine offer a great field for the investment of capital that is being withdrawn from the manufacture of White Pine of the North.—*Mississippi Valley Lumberman.*

Commenting on the foregoing the *Lumber Trade Journal* says:

While large sums of money have been invested in Southern timber by Northern lumbermen, yet the field there is practically untouched, as is evidenced by the low value of stumpage prevailing all over the South. There are fortunes awaiting holders of Southern timber which will equal if not surpass those provided in the past by the forests of the North. Owners of good timber, either Pine, Cypress or hardwoods, in the South, cannot afford to slaughter it for an unremunerative price. They would far better let it stand, assured that it will not only grow in increment but also in market value steadily and perhaps quite rapidly.

Governor John Lind, the new chief executive of Minnesota, expresses the opinion in his message to the Legislature that public opinion in that State had been educated up to the point of supporting a system of forest culture on a large scale. However, he favored increasing the extent of Itasca Park, as recommended by the game warden, and of prohibiting the sale by the State of public lands clearly within the forestry area. He thought the State might acquire title to large areas of denuded lands forfeited to the State by non-payment of taxes. He made the novel but meritorious suggestion that each country school district should have a plat of ground connected with it on which the children should be taught to plant and rear trees, and that horticulture and forestry should be made regular studies in our normal schools.



## Forest Administration.

### Excessive Timber Land Taxation.

In discussing the relation of taxation and forest destruction a lumber exchange says:

The Pine of Itasca County, Minnesota, is being cut as fast as possible simply to get it out of the way and converted into money before the tax collector can confiscate a large part of its value. Taxes are so high that timber which is not immediately cut becomes a sinkhole in which investments are lost, instead of a source of profit. If forest lands were taxed with more consideration, owners would have a natural inclination to hold them for an advance in value. As taxes are now assessed, they offset any increase in the value of the timber that results from a diminution of the Pine supply.

It is a very short-sighted policy which prompts officials in frontier counties to pile up debts for the timber owners to pay in the form of taxes. The effect is that lumbermen remove the timber as rapidly as the market will allow, and afterward let the taxes go by default. This leaves the country without any taxes with which to make improvements and meet its obligations. If county expenses were kept at a minimum and made proportionate to the actual development of the county, and were incurred only as needed, the rate of taxation would be comparatively low. Then the lumberman could afford to leave his timber standing, and in the long run the county would derive a far greater revenue from his property than under the present practice.

It can furthermore be said that the deplorable financial condition to which forested counties are brought by the method pursued of preying on the lumbermen is also accompanied by the rapid denudation of the lands. Magnificent forests, which might be held in reserve for years, are hurriedly cut off, and in a few years the lumber industry of the section is at an end. Any motive for preservation and continuance is negated by excessive taxation. It is also probable that if taxes could be entirely remitted, or made merely nominal, on cut-over lands, owners might be induced to make attempts to reforest them and hold the lands in reserve for perpetual timber growth—if not wholly as an individual enterprise, at least in conjunction with the State or National Government.

An effort should be made by the proper parties to secure the establishment of a forest reservation covering the headwaters of the Arkansas River, Lake, Pine, Four Mile, Seven Mile, the

Cottonwood and Chalk creeks. The South Platte Reserve reaches into Chaffee County one mile west of the dividing line between Park and Chaffee counties, extending south to a point about opposite the Annie C. C. mine, and with that exception Chaffee County is without the protection afforded by a forest reserve. It would seem that the Arkansas River is of sufficient importance with its great volume of water, reaching as it does through hundreds of miles of agricultural country, to demand the immediate establishment of such a reserve. No section of country has been or is being more steadily drawn on for all kinds of timber than Chaffee County, and without the placing of some such restriction as is afforded by the forest reserve regulations, it is a question of but a short time until the entire available supply of timber will be exhausted, and the inevitable result will be a diminished water supply, which will be disastrous to the agricultural interests, not alone of this county, but the entire farming section through which the Arkansas flows — *Buena Vista (Colo.) Herald*.

A special legislative commission raised last year by the General Assembly of New York to investigate the advisability of acquiring additions to the forest preserve in the Adirondacks has filed its report. The latter, a voluminous document, criticizes past extravagances upon the part of the forest department and charges too much politics in its conduct. The commission recommends the purchase of certain virgin timber lands for the exemplification of projected timber culture by the State and commends the German system of reforestation; also that the ownership be vested jointly in the State and Nation, and that the property be made a national health resort after the manner of Baden-Baden, Germany.



## State Associations.

### California.

Concerning the activity of the newly organized California Society for Conserving Waters and Protecting Forests, the *San Francisco Call* says:

A few days ago a special committee went to Sacramento to ascertain Governor Gage's sentiment toward the movement for the conservation of the waters and forests of the State. Their request for an audience was answered by the statement that they would be granted fifteen minutes. At the expiration of an hour and a quarter the committee arose, but the Governor asked them to remain and further elaborate their proposition.

The outcome of the conference was the announcement that the enterprise would have the hearty support of the Governor, and, furthermore, that he would send a special message to the Legislature advocating the passage of the measure proposed by the society.

The legislation which is thus called for provides for the appointment of a Commissioner of Irrigation, whose duty it shall be to co-operate with the United States Geological Survey in surveys and estimates of cost of reservoirs for storing flood waters for irrigation, mining and industrial purposes. It is stipulated that the commissioner shall receive no salary and that he is to hold office at the pleasure of the Governor. The measure, however, calls for the appropriation of \$10,000 to be expended by the Director of the U. S. Geological Survey with the understanding that the Geological Survey will expend from Federal appropriations an equal amount in connection with said work.

Another provision of the proposed law is that a commission be appointed for the purpose of devising means to preserve the forests of the State from destruction by fires and wanton depredation, and to report to the Governor the result of their labors. A striking feature of the desired act is the provision that until such commission shall have reported to the Governor upon the matters intrusted to their care no legislative action shall be taken toward the acceptance of the proposed donation by Congress of a million acres of arid lands.

### Colorado.

The annual meeting of the Colorado Forestry Association was held in Denver on February 15. A full account of the proceedings of the meeting has not reached *THE FORESTER*, but from press reports it is enabled to present the following:

Mr. W. N. Byers, of Denver, was re-elected President of the association. The other officers chosen were: First Vice President, Henry Michelsen, of Denver; Secretary and Treasurer, D. W. Working, of Denver.

On motion of State Engineer John E. Field, resolutions were adopted endorsing the recommendations of the National Irrigation Congress in regard to the creation of a bureau of forestry in the Department of the Interior. The recommendations of the Irrigation Congress set forth the importance of irrigation interests in the West and the necessity of maintaining a supply of water throughout the entire season. They further call attention to the fact that the forest cover conserves the snowfall, forming a natural storage for water, and equalizing the flow of the streams, also lessening the load of silt in the streams. Recognizing these facts the resolutions commend the care of the forests to the Secretary of the Interior and urge the formation of a forestry bureau, an appropriation by Congress to be made sufficient for the support of the bureau and the efficient preservation of the National forests, whether included in forest reserves or not. The resolutions also contain a recommendation that legislation be provided looking to the prevention of forest fires. After endorsing the resolutions of the Irrigation Congress the Association then adopted resolutions bearing upon local conditions and needs and urging some State legislation in the interest of forest conservation and protection.

### Nebraska.

Pursuant to a call a meeting was held at the Nebraska State University, Lincoln, Neb., on February 15, which resulted in the formal organization of a society which is to be known as the Nebraska Park and Forestry Association. The meeting was well attended, various parts of the State being represented. A constitution was adopted and the follow-

ing officers were elected: President, C. S. Harrison, of York; Vice President, E. F. Stephens, of Crete; Secretary, A. J. Brown, of Geneva; Treasurer, George A. Marshall, of Arlington; Directors, Hon. J. Sterling Morton, of Nebraska City, Dr. C. E. Bessey, of

the University of Nebraska, and Peter Youngers, Jr., of Geneva. A committee was appointed to prepare by-laws and to secure additional charter members. It is proposed to hold meetings in conjunction with those of the State Horticultural Society.

## Educational.

### Instruction in Forestry.

The University of Southern California, an institution of learning which is located at Los Angeles, has established a short course of instruction in forestry. It is to be known as the School of Forestry of the University of Southern California. The following outline of its purposes and methods is quoted from the Los Angeles *Herald*:

The aim of the school and its founders is to train foresters, who as members of the Government forest patrol, may render intelligent and efficient service in preserving the forests and extending their present area.

President George W. White of the university will be president of the school. Abbot Kinney, of Los Angeles, will lecture on the historical development of forestry and efforts in behalf of local forests. Harry Hawgood, of Los Angeles, will devote his attention to some peculiar phases of the general subject, water percolation and the retentive power of the earth for water; also the mechanical properties and values of woods. The game and fish interests involved will be cared for by T. S. Van Dyke, of this city, who is an authority on those subjects. A. H. Koebig, of San Bernardino, will impart his observation on forestry in foreign schools, and his technical knowledge of hydrography, the location of reservoir sites, etc. J. B. Lippincott, a member of the United States Geological Survey Service, will have charge of the geological and drainage questions; also the course and changing channels of streams and means of conserving their waters. T. P. Lukens, of Pasadena, will discuss methods for the preservation of our forests and for their restoration after being destroyed; also method of tree planting. Ornamental results in forestry work will be treated by A. Campbell Johnson, of Garvanza. Nursery work and the propagation of trees will be under the supervision of Harvey S. Styles, of Redlands. Prof. O. P. Phillips will lecture on the botanical and geological features of the soil. Prof. L. J. Stabler will discuss the questions of physics and chemistry that are involved. A competent lecturer in meteorology will be secured before the lectures begin.

The school will be a permanent regular department of the university, and each year will offer a course of lectures extending over a period of six months, two lectures being given each week. In connection with the theoretical work, practical field work will be given to students during the summer. Students who show a proper degree of efficiency may obtain positions as forest rangers in the Government patrol service.

The course for the present year will last for sixteen or eighteen weeks and will open in about two weeks. There will be no tuition charged, but an incidental fee of \$5 will be required of each student.

### Lectures on Forest Topics.

Under the auspices of the art department of the Civic Club of Philadelphia, Miss Mira Lloyd Dock, a member of the American Forestry Association, has been giving the four following lectures in several cities of Western Pennsylvania:

- I. National reserves, general and special.
- II. State reserves, the Adirondacks, and Pennsylvania reserves, School of Forestry, Pennsylvania Forestry laws, a prediction and its fulfillment.
- III. Municipal reserves, Parks, parkways and playgrounds, "Park-making a National Art."
- IV. Local reserves, Within reach of every village, Relation to schools, roadsides and the State reserves, Massachusetts reserves for "The protection and preservation of beautiful and historic places."

With the prospectus of these lectures there goes an admirable little list of books, circulars and so forth, bearing on forestry subjects. Miss Dock's work has been of great service; for she could not have chosen a better way to further the interests of forestry. She tells her hearers just what they wish and need to know, and in this way wins their appreciation and interest.

## THE FORESTER.

### PUBLISHER'S ANNOUNCEMENT.

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Make all checks, drafts, etc., payable to THE FORESTER.

### New Members.

Since the last issue of THE FORESTER the following named persons have been elected to membership in the American Forestry Association:

Edward P. Brennan, 4018 Vincennes Avenue, Chicago, Ill.

Mrs. Frederick Bronson, Greenfield Hill, Conn.

Dr. Arthur P. Chadbourn, North Scituate, Mass.

Mrs. Danske Dandridge, 2143 N St. N. W., Washington, D. C.

Lewis C. Flanagan, North Weymouth, Mass.

Prof. W. B. Graves, Andover, Mass.

Charles Bulkley Hubble, Bank of Commerce Building, New York, N. Y.

C. S. Hulbert, City Treasurer, Minneapolis, Minn.

Bernard P. Mimmack, 1410 G St., Washington, D. C.

William G. Rockefeller, 292 Madison Avenue, New York, N. Y.

W. M. Shephardson, Middlebury, Conn.

Two new vice presidents have been elected by the Board of Directors: Prof. Charles C. Georgeson, of the U. S. Department of Agriculture, who is stationed at Sitka, Alaska, and Lieut. H. W. French, U. S. Army, who is stationed at Manila, P. I.

### Opposition to Reservation.

The following is from the El Paso (Texas) Times, dated February 11:

A Santa Fe business man who was in El Paso the other day let out the secret that a big scheme is being hatched at Santa Fe and Albuquerque to prevent the development of the new territory being opened up by the El Paso & Northeastern Railroad.

It is said that the scheme originated in Albuquerque and that Mr. Benedict, Superintendent of Forestry for New Mexico and Arizona, has been interested in the scheme. The Santa Fe man who was in El Paso the other day stated that the Government would be asked to set aside as a forest preserve a strip of land extending from the Capitan Mountains, east of White Oaks, to the Texas line, over 100 miles in length and thirty miles wide.

It is intended that this forest preserve shall take in all of the Mescalero Indian reservation and all or that rich section of country through which the White Oaks road now runs and is being built. Mr. Hawkins, attorney for the road, was asked what he knew about the proposition and said:

"I have heard some rumors to the effect that a forest preserve would be asked for in the section of country you mention, but I hope they are merely idle rumors, for, if the Government should take that land and close it up as a forest preserve, it would simply be robbing the people who are investing their money there, and more, it would be an outrage on the Territory of New Mexico. I think it would be best not to mention the matter, for I feel confident that if any such movement is on foot the Department at Washington can be relied upon to stand by the people of New Mexico."

It is understood that Mr. Benedict will be in El Paso in a few days to make a trip through the country which it is proposed to have set aside as a forestry preserve. And it is a well-known fact that of late years forest preserves have been a popular fad with the Land Department, and in nearly every instance where a few petitioners have asked for forest preserves the petitions have been granted. The officials at Washington seem to think that the agricultural and timber lands of the West are not needed by homesteaders and are only fit for forest or game preserves.

But if this latest forestry scheme is carried into execution it will cost El Paso millions of dollars by making useless one of the richest sections of New Mexico, which is now being developed and made tributary to El Paso, while it would not interfere with the development of the mineral lands of that section, it would tie up the timber and agricultural lands and close the fine cattle ranges. Those ranges would market in El Paso every year thousands of head of cattle and large quantities of wool, and the agricultural lands would furnish thou-

sands of prosperous farms that would market their product in this city and purchase their supplies here.

According to information, certain commercial points in northern New Mexico are dissatisfied because this wealthy section of the Territory has been made tributary to El Paso, and like the dog in the manger, they propose to try to keep from El Paso's lips that luxury which they cannot get to their own. But the people of this city will make a fight for their own and will call upon the solid Texas delegation in Congress to stand by El Paso.

There is now pending in Congress a bill providing for the opening of the Mescalero reservation to homesteaders, but the Forestry Union will fight that bill, and if it carries pressure will be brought to bear on the Land Department to recommend the setting aside of this vast territory as a forest preserve. The forest fanatics will not be satisfied with the Mescalero reservation, but as already stated, they want in their preserve a territory 100 x 30 miles in area, extending in length from the Capitan Mountain due south to the Texas line.

The foregoing is not reprinted in THE FORESTER because it is in itself worthy of special consideration. With sensational phraseology and appeals to local prejudice THE FORESTER has nothing whatever to do. This does, however, open for discussion a matter to which public attention should be drawn, so that it is pertinent to make some observations in this connection. During the past two years several petitions have been made and suggestions offered, having for their purpose the segregation of the timbered areas of the Sacramento mountain region in southern New Mexico as a permanent forest reserve. These petitions and suggestions have emanated from citizens of New Mexico who were prompted by motives of public interest. Each time the matter has been agitated it has raised a storm of protest on the part of certain citizens of the town of El Paso, Texas, who assert that such a course would prevent the industrial and commercial development of the region in question. It is safe to say that the people of New Mexico would be the last to throw any obstacles in the way of the development of any part of their own Territory. When New Mexico was annexed to the United States her people were promised statehood at an early day. For fifty years

this boon has been withheld. To-day her people, both the descendants of the original Spanish-American stock and the immigrants from the eastern States, are at one in their enthusiasm for the admission of New Mexico into the Union as a State. Under such circumstances it is highly improbable that even a small part of the citizens of the Territory would jeopardize their political interests merely to spite a rival commercial community.

The Sacramento mountains are of considerable altitude, that of Sierra Blanca being 11,982 feet, and as the rainfall is abundant, many of the slopes are covered with a heavy growth of fine timber. The streams issuing from these mountains are of some local importance, as they make possible the development of agriculture in the arid valleys below. The climate is mild, the productions are varied, and these valleys, when properly developed, will undoubtedly support a thriving population. With this desired end in view it certainly cannot be said that the establishment of a forest reserve, to include all the lands not suited for agriculture, would work injury to the interests of any one now concerned. On the contrary, such a course would insure the most equable distribution of the water supply throughout the growing season, and it would at the same time provide for the perpetuation of the forests in a productive state, with an assurance of an ample supply of timber for local needs for all coming time. For these reasons it would also be for the best interests of the city of El Paso itself if, as is claimed, this region is to become permanently tributary to that growing commercial center. It is true that El Paso might be the gainer temporarily if those splendid forests were to be stripped to meet a demand for export, but the profits thus achieved would not compensate for the reaction that would surely follow when the forests were exhausted and the highest agricultural development seriously, if not permanently impaired. The new railroad which has been built from El Paso into the Sacramento mountain country may

not pay as high a dividend during its earlier years if such a conservative policy is adopted, but in the long run its promoters would be justified in encouraging the very movement they now seek to oppose.

Much of the land in the Sacramento mountains is not fit for agriculture. It is destined by nature to produce forest crops and nothing else. If its forest cover were removed it would sooner or later become a barren waste, unproductive and incapable of holding in check the rapid descent of waters that might otherwise be utilized for irrigation. The retention of lands better suited for agriculture or mining has never been advocated even by the most ardent forestry enthusiast. Moreover, it is not proposed to withhold the products of the forests of any reserve from the use of the people for whose benefit all reserves are created. The regulations of the Department of the Interior make ample provisions for the use of timber from the reserves for domestic, agricultural, and mining purposes. The establishment of a reserve within the bounds of the region indicated would not interfere with the rights of any one, but in the end it would inure to the benefit of all.

#### New Forest Reservation.

By proclamation of President McKinley, dated January 30, the Trabuco Canon Forest Reserve in Southern California was enlarged by the addition of a contiguous area estimated to contain 50,000 acres. The total area is now 109,920 acres. It was enlarged as the result of the petition of the residents of adjoining valleys.

On February 10 two new reservations were created by executive proclamation—the Fish Lake Reserve in Utah and

the Gallatin Forest Reserves in Montana. The Utah Legislature had memorialized Congress to grant a part of the Fish Lake tract for use as a State park. As it is difficult to secure the passage of such a measure Representative King, of Utah, concluded that a forest reserve would answer practically as well. The lands embraced within the limits of this reserve are all of a mountainous character and surround the lake from which it takes its name. Its area is 67,480 acres. The Gallatin Forest Reserves include the even-numbered sections on a tract that is drained by the Gallatin River near Bozeman. These 640-acre reserves, whose aggregate area is 40,320 acres, were created at the request of Mr. S. M. Emery, Director of the Montana Agricultural Experiment Station, and others who were equally as interested. The odd-numbered sections in the tract are embraced within the limits of a railroad land grant, thus necessitating the creation of separate reserves of each of the even-numbered sections. Although technically the Federal Government will have no jurisdiction over these unreserved lands, yet it is plain that they will be benefited for they will at least be protected from the ravages of fire by the forest patrol.

Reference is made elsewhere in this issue of *THE FORESTER* to excessive taxation of pine lands in Minnesota. In a recent letter on this subject Mr. H. B. Ayers, of Carlton, Minn., states that in 1898 he paid \$3.94 in taxes on a tract of thirty six acres of pine land which is valued at \$3.00 per acre, virtually at a rate of 3.64 per cent per annum on the actual market value. On another tract of forty acres, also valued at \$3.00 per acre, the tax was \$6.58, amounting to a rate of 5.4 per cent.



## Recent Publications.

*The Adirondack Spruce*, by Gifford Pinchot. (The Critic Company, New York City.) "The owners and operators of Spruce lands in the Eastern United States will find within the covers of this little book a collection of facts and figures which is intended first of all to be of practical use. The information it contains is the product of a prolonged investigation conducted throughout with that intention. If its results have any merit, therefore, it must be because they are capable of assisting American lumbermen to get better returns from their investments in Spruce lands through conservative lumbering and successive crops than they could by considering the productiveness of these lands as of merely temporary interest."

These words, with which the preface opens, will serve to indicate at once the author's aim and the reader's standard of criticism.

To begin with, a word must be said about the investigation which forms the pith of the text, about its subject-matter and the handling of it. Ne-Ha-Sa-Ne Park, on the western side of the Adirondacks, was the principal field of work. Dr. W. Seward Webb, its owner, contributed the funds needed for the work; while Mr. Pinchot undertook the task of supervision, and afterwards, that of throwing the material collected into the form of the present book. The measurements taken, which cover nearly 2,500 trees and over 1,000 acres, were made for the most part under the direction of Mr. Henry S. Graves.

To turn now to the book itself. Its convenient size and business-like appearance suggest what we afterwards find true of its contents. From first to last the writing is terse, clear and straight to the point. We are not drawn into the details through which the material had to pass on its way to completion; but are given the valuable results in an interesting, almost a pictorial, form. By means of a couple of simple devices we are made to see the forest before we are asked to follow the author in his statements and reasonings about it. The devices are these: First, the forest as a whole is classified under four types, distinguished according to soil and elevation, and further emphasized by the addition of figures showing the relative extent of each type: Swamp lands, 22 per cent; Spruce flats, 10 per cent; Hardwood lands, 42 per cent; and Spruce slopes, 26 per cent. Second, a table for each one of these types shows the average size and occurrence of Spruce, and associated trees, over its particular area. When once we have thus got a picture of the forest in our mind's eye, there is no difficulty in following the exposition from this point. The Spruce in its silvicultural character is treated next, and then come the species associated with the Spruce within each of the four types. From this presentation of the general forest con-

ditions the author now comes down to a preliminary practical question: What are the effects of cutting on subsequent growth? The answer is supplied in an important table (No. 7), which is based, like all the tables in the book, on unquestionable data, and offers a valuable working suggestion. Growth in the original forest, which is next considered, comes out in contrast.

The most valuable tables in the book are the Yield Tables. These "are prepared for the purpose of predicting future crops of timber after cutting to a given limit on lands yielding a known amount of Spruce." By the aid of tables of volume, or cubic contents, and the tables showing the rate of growth under a variety of conditions, it is possible, if we know how much Spruce has been cut on any given number of acres, and down to a given diameter limit, to tell how soon again a like crop can be cut from the same area. And by comparing the amount of a given crop and the limit to which it has been taken with the time required to replace a similar stand, or with the time required to replace a stand of some other diameter limit, we are able to determine what diameter limit it is most profitable to choose in each case, according as we wish to reap the full return at one general cutting or to defer part of the return for any preferred number of years. The working of these yield tables is pointedly illustrated by a number of problems which they are made to solve.

The second part of the book contains a working plan adapted to the conditions described in the first part. As a part of it there are here given the following nine general rules for cutting under conservative methods:

"1. Only trees marked by the forester must be cut, and each tree marked must be cut unless a reason satisfactory to the forester can be given for leaving it.

"2. No timber outside the line of a road shall be used for corduroys, culverts, or other road purposes, until all timber cut for the clearing of the road has been utilized; and when more timber is necessary, all available trees of other kinds within reach must be used before any Spruce is taken.

"3. All lumber roads must be marked out by the contractor with the co-operation and assistance of the forester.

"4. As a protection against fire all tops must be cut or lopped so that the thin branches will be brought in contact with the ground by the weight of the winter's snow.

"5. Extreme care must be taken to prevent fire. No fire must ever be lighted where it can get into a rotten log or into duff.

"6. Great care must be taken not to injure young growth in felling timber, or to bark valuable young trees in skidding.

"7. Felled trees must be cut into logs at



once, to release young growth crushed by their fall, unless a reason satisfactory to the forester can be given for some other course.

"8. Any young growth bent over by felled trees must be released and allowed to straighten without delay.

"9. Provision for carrying out these regulations should be made in all contracts with lumbermen, and fines should be imposed by the contracts for failure to comply with them."

The author adds: "The application of such general rules to specific cases is the province of the forester."

This working plan, which, as has been said, was drawn up to meet the conditions of Adirondack forest management, and more especially the conditions in Ne-Ha-Sa Ne Park, has been in operation for nearly a year, over the property of Mr. Webb and that of Mr. Wm. C. Whitney, an area of 106,000 acres. Mr. Patrick Moynihan, a very successful lumberman of well-known practical ability, has done the cutting under the working plan and is thoroughly convinced that it is a good thing. It is gratifying to know that other owners of Adirondack lands have expressed their intention to have similar plans prepared for their forests also by the Division of Forestry. Thus the book has done what it was intended to do.

It is a significant fact that many of the data put to use were collected on the property of the Santa Clara Lumber Company, near Santa Clara, Franklin County, N. Y. This, together with the approbation of the practical lumbermen who are doing the work it recommends and the spirit and scope of the book itself, renders it specially valuable as a sign of the growing friendliness between lumberman and forester, who at the last are dependent on each other.

A review of *The Adirondack Spruce*, however slight and cursory, must at least mention the illustrations with which the teachings of the text are so tellingly brought home. These add, besides, an air of completeness and verity.

*Measuring the Forest Crop*, by A. K. Mlodziansky. (Bulletin No. 20 of the Division of Forestry, prepared under the direction of B. E. Fernow.) A salient fact of this publication is that almost throughout it employs the cubic foot, a unit of measurement practically unused in this country. The board foot, the unit in general use in all parts of the United States, is mentioned in two connections, once on the first page, where it receives scant but contemptuous mention, and again in the discussion of the determination of the volume by sample trees and sample areas. The method of treatment adopted is perhaps more largely responsible for this result than any deliberate disregard of the American lumber unit, but the effect is the same.

It might be said in justification of this course

that the board foot is in itself misleading and uncertain as a standard, and that in consequence it is not important that it should receive any but the most casual reference. This reply would overlook the fundamental fact that the board foot is a vastly more practical unit than the cubic foot, for the reason that it tells a man not what absolute quantity of wood there is in his log, without reference to waste in manufacture, as the cubic foot does, but how much usable wood his log contains, with all due allowance made for necessary loss before the log can be converted into merchantable lumber. This, and not the absolute cubic contents, is the fact of importance. It is quite true that the variety of log-scales in use in different parts of this country tends to confusion, and that in other ways there is room for improvement, but when all is said the fact remains that the board foot is an immensely more practical and usable measure than the cubic foot. The different conditions of the lumber trade in the various parts of the United States, which determine in one place that a log is merchantable when it will square four inches, and in another not till it will square twelve, demand a unit which will express the merchantable value, not the utterly irrelevant solid contents of a tree or a forest. Even if that were not true it would be unwise in a publication of this kind to ignore the unit in general use in the country for which the book was written. To do so is to create a needless prejudice against the book and the Division from which it emanates. It is but fair to the latter to add that its course during the last few months indicates unmistakably that no such lack of practical application will be found in any of its future bulletins.

Considered strictly as a summary of European methods there is much to be said in praise of Bulletin No. 20. It covers fairly the best of them, and in some respects it is the most usable treatise of the kind in the English language. On the other hand the rigid manner of presenting these methods robs them of a large part of whatever elasticity they have in their original forms, and the direction for work in the field at times suggest that the author is quietly amusing himself at the expense of his reader, as when on page 26 he advises him to have his sample tree sawed up to ascertain its contents in lumber. Such a procedure would seem superfluous to the practical American mind when the same result can be reached with all the accuracy the method permits by simply consulting a little book which may be carried in the vest pocket.

*Water Supply and Irrigation Papers*, Nos. 17 and 18, published by the U. S. Geological Survey, have been received. They are both written by Carl Ewald Grunsky, who treats, in the first, of Irrigation near Bakersfield, Cal., and in the second, of Irrigation near Fresno, in

the same State. A third paper is to follow, which will complete the set of three, dealing with irrigation in San Joaquin Valley, of which Nos. 17 and 18 are the first and second. The papers give careful and graphic descriptions of the local methods of irrigation, and are specially well illustrated with maps and half-tones.

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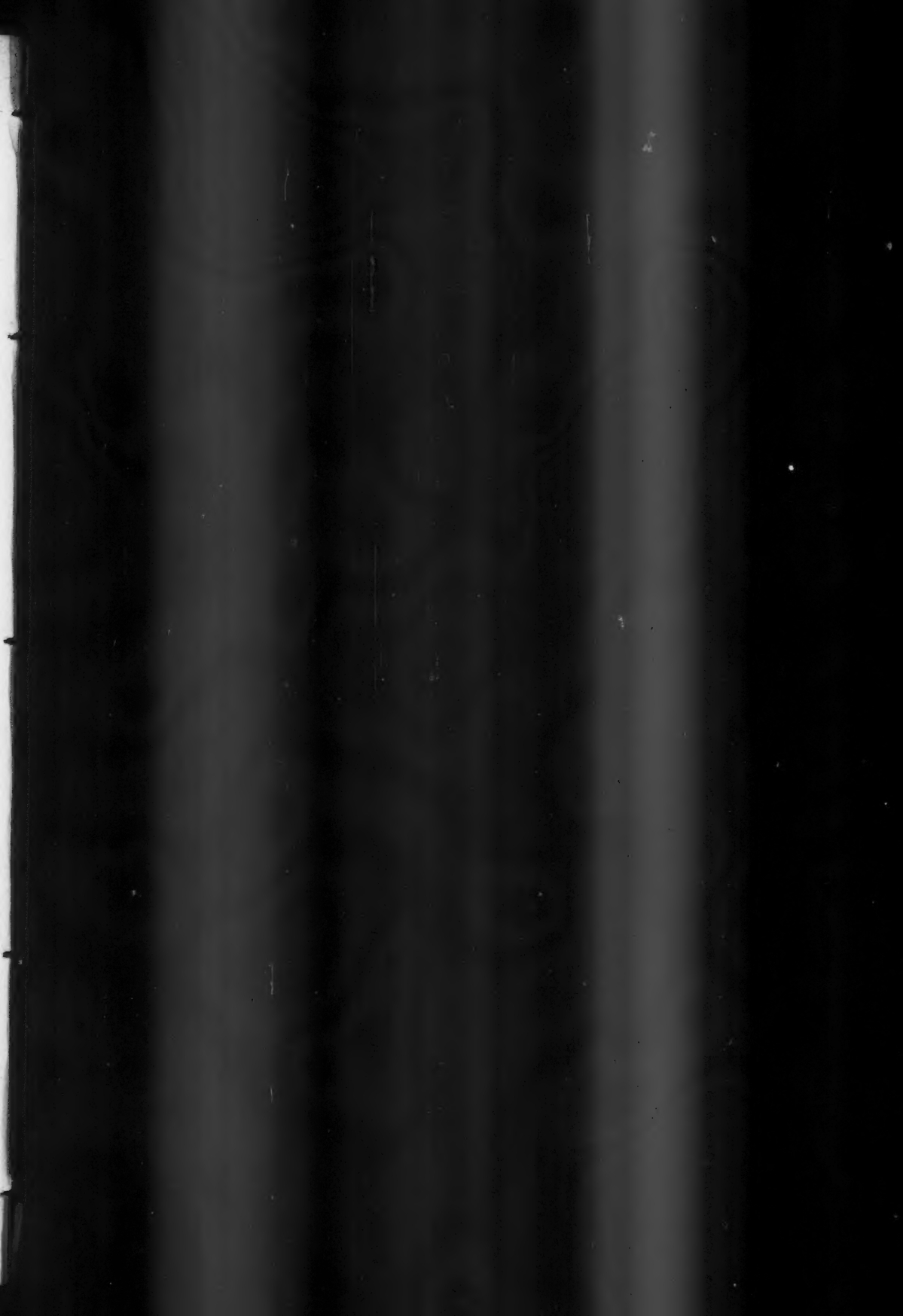
*Glaciers of Mount Rainier*, by Israel Cook Russell; with a paper on *The Rocks of Mount Rainier*, by George Otis Smith. This pamphlet is an extract from The Eighteenth Annual Report of the U. S. Geological Survey, Part II. These papers are chiefly of a theoretic nature but they contain much that is of general interest and many illustrations as well. Mount Rainier lies eleven miles west of the crest of the Cascade Mountains and forty-two miles southeast of the city of Tacoma and in the northern part of the great forest reserve which bears its name. The forests by which it is surrounded, especially those on the side toward Puget Sound, are among the most magnificent on the continent. The Pacific Forest Reserve, an area about thirty-five miles square, was originally made by proclamation of President Harrison in 1893. By proclamation of President Cleveland, dated February 22, 1897, this reserve

was enlarged to include more than 2,200,000 acres, since which time it has been known as the Mount Rainier Forest Reserve.

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*American Lumber*, by B. E. Fernow, in *The Chatauquan* for February.

This is a popular article, which gives important facts about American lumber; the various species now used, the development of the lumber industry in the last fifty years—attributed chiefly to the railroads—the prospects of future development and supply, and the statistics which serve as a basis for calculations in dealing with the treatment of our forests and with the problem of permanent supply. It notes that though we possess in all not more than 500,000,000 acres of so-called forest land, yet millions of acres within this area are barren of merchantable timber, while if our present rate of consumption is to go on, we need 600,000,000 acres under full forest. It emphasizes our wastefulness in using wood where stone or iron would be better, and points out that lumbermen of intelligence all over the country are alive to the fact that the forester stands for their own better judgment. Dr. Fernow does not neglect to call attention once more to the great variety of useful species which renders our country unique.





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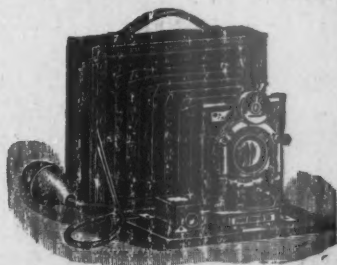
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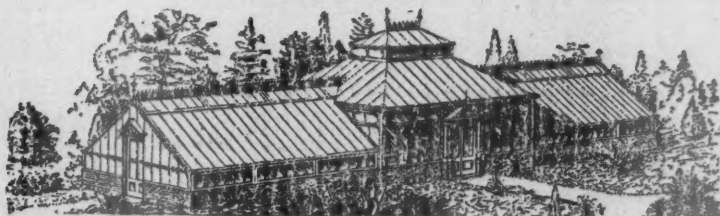
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